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CONTRACTOR QUALITY CONTROL PLAN FOR BIOSLURPING PILOT SCALE TEST AND DESIGN NS MAYPORT FL

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BATTELLE

CONTRACTOR QUALITY CONTROL PLAN

FOR

BIOSLURPING PILOT-SCALE TEST AND DESIGN AT NAVAL STATION MAYPORT, FLORIDA

Contract No. N47408-95-D-0730, Delivery Order No. 0011

June 14, 1996

by

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ACRONYMS AND ABBREVIATIONS

BTEX	benzene, toluene, ethylbenzene, and xylenes
CO	Contracting Officer
COTR	Contracting Officer Technical Representative
CQC	Contractor Quality Control
EPA	U.S. Environmental Protection Agency
HASP	Health and Safety Plan
LNAPL	light, nonaqueous-phase liquid
MDL	method detection limit
NA	not applicable
NFESC	Naval Facilities Engineering Service Center
NTR	Navy Technical Representative
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
OWTP	Oily Waste Treatment Plant
ppm	parts per million by volume
QC	quality control
RPM	remedial project manager
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOA	volatile organic analysis

CONTRACTOR QUALITY CONTROL PLAN

BIOSLURPING PILOT-SCALE TEST AND DESIGN AT NAVAL STATION MAYPORT, FLORIDA

June 14, 1996

1.0 INTRODUCTION

This Contractor Quality Control (CQC) Plan provides specific quality control (QC) information relating to the scope of work under Delivery Order 0011 of the U.S. Naval Facilities Engineering Service Center (NFESC) Contract No. N47408-95-D-0730. The scope of work includes a field program to perform a pilot-scale bioslurper test and full-scale design at Naval Station (NAVSTA) Mayport, Florida. The CQC Plan is designed and will be implemented to serve as a management system for performing the bioslurper pilot-scale testing and full-scale design activities in compliance with the terms of the contract. The CQC encompasses all phases of the work to ensure that the specified materials and methodology are acceptable and conducive to the production of meaningful test results.

1.1 Site Location and Background

Site-specific information contained in this report was obtained from the document entitled *RCRA Facility Investigation: Group II Solid Waste Management Units* (January, 1996), prepared for the Naval Facilities Engineering Command by ABB Environmental Services, Inc.

NAVSTA Mayport is located on a peninsula in northeast Florida and lies approximately 12 miles northeast of Jacksonville. The complex is bounded by the Atlantic Ocean to the east and the St. Johns River to the north and west. The area is used primarily for industrial purposes. NAVSTA Mayport, occupying 3,401 acres, has been in existence since 1942. Current activities at the station include support services for surface fleet and aircraft, including ship and aircraft repair and maintenance.

Solid Waste Management Unit 7 (SWMU 7) is made up of the Oily Waste Treatment Plant (OWTP) Sludge Drying Beds. SWMU 7 was constructed in 1979 and consists of four unlined sludge-drying beds enclosed by earthen berms. The sludge-drying beds received sludge from the OWTP clarifiers and bilge water from receiving tanks 99 and 100. Records indicate that approximately 1,500 gallons of sludge were transferred to the drying beds on the average of twice per week until late 1994. The

easternmost drying bed was excavated in 1989, at which time a lined, diked enclosure and three bilge water receiving tanks were constructed at the site.

1.2 Project Objectives

The objective of this project is to conduct a short-term pilot-scale bioslurper test to determine the effectiveness of bioslurping in the recovery of free product and treatment of TPH-contaminated soil in the vadose zone at SWMU 7. The resulting data will be used to design a full-scale bioslurper conceptual design. Field testing will be performed to predict light, nonaqueous-phase liquid (LNAPL) recovery and to obtain site-specific performance data useful in designing and costing a full-scale bioslurper system for removal of free product and treatment of the contaminated soil.

1.3 Scope of Work

The bioslurper field activities at SWMU 7 will consist of a 2-week pilot-scale test to evaluate the recoverability of LNAPL from an existing site recovery well using the bioslurping technology. Battelle will evaluate site-specific data received from the Navy and address site-specific variables before beginning field activities. The field program involves installation and operation of the bioslurping system supported by a range of site characterization, performance monitoring, and chemical analysis activities.

The bioslurper system for the short-term test will be installed using a single monitoring well and will be operated for a period of 2 weeks. Soil gas monitoring points will be installed prior to startup of the bioslurper system. Measurements of the extracted soil gas composition, free-product thickness, and groundwater level will be made during the test. In addition, aqueous discharge and vapor discharge samples will be collected throughout the test period. During field activities, Battelle also will conduct in situ respiration testing to establish vadose zone hydrocarbon biodegradation rates and will perform a vacuum radius of influence test to aid in determining the optimum well spacing for full-scale system design.

1.4 Quality Control Objectives

The objective of the CQC Plan is to provide a framework to ensure that quality is integrated into major aspects of project execution. Project quality objectives include meeting technical, regulatory, health and safety, reliability, budget, and schedule commitments in a satisfactory manner.

This CQC Plan identifies quality control activities to be implemented during various phases of the project to ensure that work elements are performed according to specifications and in conformance with the approved work plan. The QC activities refer to the actions taken by Battelle personnel on a daily basis to build in quality at every phase of the project. QC activities include the use of calibration standards; application of testing, inspection, and corrective action protocols; and requirements for document control.

2.0 RESPONSIBILITIES

Battelle will be responsible for daily collection and recording of data reflecting daily and cumulative-to-date work completed and the resources used for each task of the project. All project staff have the responsibility for maintaining quality control and for meeting the requirements of this document throughout each phase of the project. A pre-installation meeting will be held prior to initiation of the pilot-scale demonstration to address any QC concerns and discuss requirements of involved staff. The project engineer will directly supervise field activities; will monitor all onsite activities; and will be responsible for all aspects of operations, health and safety, quality control, and schedule. The project engineer, in consultation with the program manager, will have the authority to stop work if required due to deficiencies and to initiate alternative procedures due to changed site conditions.

3.0 QUALITY CONTROL OF DOCUMENTATION

This section discusses the approach to integrating quality and ensuring conformance to specifications in project activities involving documentation. All project plans and submittals prepared for this project will receive a technical review by Battelle. The Battelle project engineer will be required to assign qualified review team members and schedule reviews so that project submittals can be forwarded for final approval prior to the required submittal date. Battelle recognizes the importance of documenting quality control activities and results to demonstrate work quality. All documents will be identified with the date, contract name and number, contractor name and address, number and title of document, and signature of

the originating individual. The following submittals will be prepared at appropriate times during project execution:

- Test Plan*
- Site Health and Safety Plan*
- Contractor Quality Control Plan*
- Testing Lab Qualifications Document*
- Operations and Maintenance Manual
- Pilot-Scale Report and Full-Scale Design.

All calculations that are included in documentation will have sufficient explanation provided so that a technically qualified person can easily review and understand the calculations and verify the results. All calculations will include:

- A statement of the purpose of the calculations
- A discussion of the calculation method
- Assumptions and their justification
- Data references and references for the equations used
- Numerical calculations, including units
- Results.

All calculations will be formally reviewed prior to use of the results in subsequent activities or as a presentation in a report or a deliverable.

Conceptual design drawings and figures will be identified by a unique number that will be maintained even if the drawing is revised. Drawings will be signed by the draftsperson performing the work. Revisions will be noted on the original drawings with a brief note describing each revision.

* These deliverables will be submitted prior to initiating field activities.

4.0 QUALITY CONTROL OF FIELD ACTIVITIES

Quality control of field operations will be ensured by adherence to the Test Plan, Program CQC Plan, and corporate QA policies. All program and corporate policies concerning field activities, cost accounting, resource utilization, and performance monitoring in the field will be followed unless otherwise directed by the Navy Technical Representative (NTR).

Battelle will stop fieldwork on any item or feature pending satisfactory correction of any deficiency noted by the Battelle program manager, the project engineer, the Navy Remedial Project Manager (RPM) or the NTR. Battelle will not continue installation or operation of any feature of work containing uncorrected work unless Battelle and the NTR agree that the item can be corrected without disturbing completed work.

The field area will be organized to provide an efficient working place for the project team. Information pertaining to the project, such as copies of work plans, health and safety plans, and product and equipment specifications and information, shall be maintained within the fieldwork area. A file will be maintained at the fieldwork area. It will be organized to enable easy access to project documentation. At a minimum this file will include:

Accident reports. Any accident that occurs during field activities will be documented.

Boring logs. The boring logs will include bore depth and visual observations regarding the extent of contamination.

Certifications. Certifications for Occupational Safety and Health Administration (OSHA) 40-Hour Hazardous Waste Training, 8-Hour refresher courses, and Site Supervisor training will be kept on site.

Site Safety Log. A Site Safety Log will be maintained at the fieldwork area to document health and safety activities.

Chain-of-custody documents and sample logs. Chain-of-custody sheets and sample logs will be maintained for each sample collected and shipped to a laboratory for analysis.

Record book including notes of daily activities. A field logbook will be maintained on site documenting daily field activities, pilot-test data, and visual observations.

Manifests. Shipping manifests for all items that are shipped to and from the site will be kept on site during field activities.

Emergency phone numbers and hospital map with written directions. This includes phone numbers of emergency personnel and directions to the nearest off-site hospital and the base hospital.

Project contact phone numbers. The names, addresses, and phone numbers of project personnel will be kept on site during field activities.

4.1 Process Equipment Inspections

Field inspections are primarily visual examinations but may include measurements of materials and equipment being used. Inspections are performed to ensure that the field bioslurping process equipment and field instrumentation are operating correctly. The process equipment will be visually inspected on a daily basis to ensure that it is operating properly. Inspection will include monitoring of fluid levels inside tanks, system vacuums and pressures, equipment operating temperatures, and flowrates. In addition, the following preventative maintenance will be performed routinely:

- Inspect the oil/water separator (OWS) on a daily basis. If emulsion has accumulated inside the OWS, the emulsion will be skimmed off the surface and deposited into the 225-gallon surge tank.
- Inspect the emulsion filter tank daily. Clean the tank when approximately a 1-inch-thick layer of emulsion is present. Replace the filter as needed.
- Clean the particulate traps on the liquid ring pump every 5 days. Accumulation of particulate inside the traps could prevent water from recirculating inside the ring pump resulting in damage to the pump.

Field inspections will be performed on a daily basis during pilot-scale testing for the purpose of confirming that a specific guideline, specification, or procedure for the activity is successfully followed. In addition, materials are inspected for compliance with contract requirements. Field inspections are performed either during the installation or testing activity or shortly after completion of the work. The results of visual inspections are documented in the site logbook.

4.2 Pilot-Scale Testing

Pilot-scale testing at SWMU 7 will be performed by Battelle according to the procedures specified in the *Test Plan for Bioslurping Pilot-Scale Test and Design at Naval Station Mayport* (Battelle, 1996). Site activities will be monitored daily and relevant data will be recorded in a logbook that will be kept at the site throughout the duration of the test. Data collected during activities associated with pilot-scale testing

will be examined and validated on a daily basis. If the data reveal inconsistencies or discrepancies, appropriate measures will be taken to explain the deviation or to remedy the cause of such a deviation.

4.3 Sampling and Analytical Methodology

The sampling and analytical requirements include both field and laboratory analytical quality control requirements which are described in more detail in *Best Practices Manual for Bioslurping* (Battelle, 1995) and the *Test Plan for Bioslurping Pilot Scale Test and Design at Naval Station Mayport* (Battelle, 1996). Sampling will be performed according to the standard methods described in these documents.

4.3.1 Aqueous Effluent, Off-Gas, and Soil

The following sections describe the sampling and analytical methodology for aqueous effluent samples, off-gas samples, and soil samples collected during bioslurper pilot-scale testing.

Aqueous Effluent Sampling

A total of six aqueous effluent samples will be collected from the bioslurper OWS discharge for analyses of benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH). Samples, including a duplicate, will be collected at various stages throughout the bioslurper pilot testing activities in order to ensure quality data. Sample containers, preservation requirements, and analytical methods are described in Table 1. All samples will be labeled and shipped with the proper chain-of-custody forms via an overnight courier to a qualified laboratory for analyses.

Off-Gas Sampling

A total of six off-gas samples will be collected throughout various stages of the bioslurper pilot test for analyses of BTEX and TPH. Five samples will be collected from the bioslurper stack prior to any vapor treatment. One posttreatment sample will be taken soon after system startup in order to quantify actual vapor discharge to the atmosphere. Samples will be collected by connecting an evacuated 1-L, Summa polished air-sampling canister to the bioslurper vapor discharge stack.

Table 1. Sampling and Analytical Methods

Analysis	Method	MDL*	Container	Sample Size	Preservation	Holding Time
Soil Samples						
BTEX	EPA 624/8240	20 µg/kg	Brass sleeve	100 g	Cool, @ 4°C	14 days
TPH (as gasoline)	EPA Mod. 8015	10 mg/kg	Brass sleeve	100 g	Cool, @ 4°C	14 days
Stack Gas						
BTEX	EPA TO-3 (modified)	0.1 ppmv*	Summa Canister	Both analyses from a common 1-L canister	NA	30 days
TPH	EPA TO-3 (modified)	0.1 ppmv	Summa Canister		NA	30 days
Aqueous Effluent Samples						
BTEX	EPA 624/8240	1 µg/L	Borosilicate glass, VOA vials	Both analyses from a set of 3 × 40 mL vials	HCl to pH < 2, @ 4°C	14 days
TPH	EPA Mod. 8015	0.5 mg/L	Borosilicate glass, VOA vials		HCl to pH < 2, @ 4°C	14 days

*MDL = method detection limit; NA = not applicable; ppmv = parts per million by volume; and VOA = volatile organic analysis.

The evacuated canister is connected to the sampling line and a vapor sample is pulled until atmospheric pressure inside the canister is reached. Analytical methods for off-gas samples are listed in Table 1. All samples will be labeled and shipped with the proper chain-of-custody forms via an overnight courier to a qualified laboratory for analyses.

Soil Sampling

A total of four soil samples will be collected during the installation of monitoring points for analyses of BTEX and TPH. The samples will be collected with a manually driven auger containing brass sampling sleeves. Soil samples will be taken from various depths in the soil profile to allow adequate characterization of the vadose zone. Sampling equipment will be decontaminated after each sample is taken. Following collection of the soil samples, the sleeves will be sealed with inert caps, labeled, placed in plastic bags, and stored on ice. Sample containers, preservation requirements, and analytical methods are described in Table 1. All samples will be shipped with the proper chain-of-custody forms via an overnight courier to a qualified laboratory for analyses.

4.3.2 Sample Control and Quality Assurance

Field duplicates will be collected and will undergo the same analyses as the soil and water samples to document QA/QC of sample collection and handling methods. Additionally, the laboratory will prepare and analyze a laboratory blank to demonstrate that the laboratory is free of contaminants. Standard methods for data validation will be include verification of sample holding times; use of QC samples; validity of spikes, surrogates, internal standards, matrix spike samples, duplicates, and field blanks; data reduction; and dilutions.

4.3.3 Field Records

All information pertaining to the sampling effort will be recorded in a sample logbook containing the following information:

- All sample numbers, sampling date/time, and the chain of custody number.
- Names of all members of the sampling team.

- A description of sampling activities, sample locations, descriptions of any deviations from the test plan and reasons for the variance, and observations made during sampling activities.

- Either originals or photocopies of the chain-of-custody forms and airbills for all samples.

4.4 Field Sampling and Analysis

4.4.1 Calibration

Field instrumentation that will be calibrated on a daily basis includes a GasTech O_2/CO_2 analyzer, a TraceTechtor™ hydrocarbon analyzer, and a Marks Helium Detector (or equivalent). Calibrations will be performed in accordance with manufacturers' instructions. Certified oxygen, carbon dioxide, and hexane calibration gases will be used to calibrate the meters. Calibration records will, at a minimum, contain the following information:

- Type of equipment
- Equipment identification number
- Calibration method/procedure
- Reference equipment and identification number/standards
- As-found and as-left calibration values
- Initials of calibration technician and date.

If the equipment cannot be calibrated within the specified tolerances, it will not be returned to service until appropriate repairs have been completed.

4.4.2 Methodology

Soil gas sampling will be conducted periodically to determine system performance and to monitor concentrations in the bioslurper off-gas. During soil gas sampling events involving field screening, the following procedures will be followed:

- Instrumentation devices will be purged with air and rezeroed between every sample.
- Samples will be collected in Tedlar™ bags with a capacity of ~1 L.
- Tedlar™ bags will be purged once with the sample gas immediately before collection of the sample to be analyzed.
- Duplicate samples and blanks will be collected to ensure quality data and properly functioning instrumentation.

5.0 CHANGE/MODIFICATION CONTROL

A delivery order modification is required for changes that impact project requirements. A delivery order modification may be necessary due to a changed condition on site which affects the performance of work against the negotiated delivery order, or as a result of a request by the NTR for additional work that was not identified in the scope of work for the delivery order. Either Battelle or the NTR may initiate a change notice. When a modification to the work is required, Battelle will submit schedule and cost impacts for each proposed change as quickly as possible after identification of the changed condition.

The steps for initiating a delivery order modification resulting from a changed condition in the field are summarized below:

- The Battelle Program Manager will be notified immediately by field personnel of any changed conditions.
- The Project Engineer will direct the preparation of a detailed description of the changed condition and its anticipated effect on performance and cost of the task or delivery order. This information will be promptly forwarded to the Project Manager.
- A written notification that a changed condition has occurred or will occur will be provided to the Contracting Officer (CO) and the Contracting Officer Technical Representative COTR after review and concurrence by the Program Manager.
- A detailed cost estimate for the change will be prepared and submitted to the CO within 30 days of the written change notification.
- The Program Manager and Project Engineer will negotiate the delivery order modification with the CO and COTR.

The estimated cost of performance will not be exceeded without prior written authorization from the NTR via a delivery order modification.

6.0 REFERENCES

ABB Environmental Services, Inc., 1996. *RCRA Facility Investigation: Group II Solid Waste Management Units*, prepared for the Naval Facilities Engineering Command.

Battelle. 1996. *Test Plan for Bioslurping Pilot -cale Test and Design at Naval Station Mayport, Florida.* Prepared by Battelle Columbus Operations for the Naval Facilities Engineering Service Center, Port Hueneme, California.

Best Practices Manual for Bioslurping. June 1996. Prepared by Battelle Columbus Operations for the Naval Facilities Engineering Service Center, Port Hueneme, California.